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the in-house research arm of the U.S. Department of Agriculture

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Evaluation of New Canal Point Sugarcane Clones

1997-98 Harvest Season

B. Glaz, J.C. Comstock, P.Y.P. Tai, J.D. Miller, and L.Z. Liang *

United States Department of Agriculture
Agricultural Research Service
ARS-151

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About the Agricultural Research Service



We are the [U.S. Department of Agriculture's](#) main in-house scientific research agency. For a few examples of what we've done for you, see "[ARS & You](#)."

Our job is finding solutions to agricultural problems that affect Americans every day, from field to table—

- Protecting crops and livestock from pests and disease,
- Improving the quality and safety of agricultural products,
- Determining the best nutrition for people from infancy to old age,
- Sustaining our soil and other natural resources,
- Ensuring profitability for farmers and processors,
- Keeping costs down for consumers, and
- Providing research support to other federal agencies.

Lasting solutions to these problems are unlikely to have a quick commercial payoff that might otherwise convince private industry to do the research. We work toward solutions by pursuing scientific discoveries. But our task is truly complete when we transfer discoveries to society as useful technology and knowledge.

Our scientists frequently collaborate with research partners from universities, companies, other organizations and other countries.

We take great care in designing and organizing our research effort, and we listen—and respond—to those with a stake in the outcome. (More in "[The Research Enterprise](#)")

We follow a strategic plan we develop to meet our stakeholders' needs and support USDA's mission. We check our progress in carrying out that plan, and we modify it as circumstances require. (More in "[Plans and Reports](#)").

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A few facts about the scope of our organization (figures rounded)—

- 1,200 research projects within 22 National Programs
- 2,100 scientists
- 6,000 other employees
- 100 research locations including a few in other countries
- \$1 billion fiscal year 2003 budget

ARS is one of four agencies in USDA's [Research, Education and Economics](#) mission area. The others:

- [Cooperative State Research, Education and Extension Service](#)
- [Economic Research Service](#)
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Research



[National Programs](#)—Each research project is part of one or more of our 22 National Research Programs.

[Research Projects](#)—We conduct 1,200 research projects to solve problems in crop and livestock production and protection, human nutrition, and the interaction of agriculture and the environment.

[International Programs](#)—Though they fall under the national programs, some of our projects are carried out overseas.

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Navigation

The site is organized around 7 major information areas, or *main navigation categories*.

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- *About Us?* look here to find the ARS mission, and general information about how we operate and what we do.
- *Research?* look here to find the ARS research programs. Search programs, projects, publications and other research results, or find out how ARS research is peer reviewed for relevance and quality.
- *Products & Services?* look here to find things like technology products (patents, for example), ARS-produced software, datasets, educational materials and outreach information.
- *People & Places?* look here to find an ARS employee or to find out about an ARS location.
- *News & Events?* look here to see the latest information on ARS research as well as the ARS magazine and other informational products.
- *Partnering?* look here for information on cooperative projects and technology transfer in ARS.
- *Careers?* look here for the latest job listings and other human resource information.

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ARS continually looks for opportunities to partner with private sector businesses, other federal agencies, state and local governments, universities, and its customers. These partnerships are designed to augment research programs, expedite research results to the private sector, exchange information and knowledge, stimulate new business and economic development, enhance U.S. trade, preserve the environment, and improve the quality of life for all Americans.



Because of research and partnerships, a waste product is now something of value. Kenaf stalks are used to make paper, and ARS researchers found how to turn waste from the process into fertilizer and feed binder. Cooperative agreements with private firms helped this technology make the leap from laboratory to production.

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HunterT@ba.ars.usda.gov

Mid South Area

Alabama, Kentucky, Louisiana, Mississippi, and Tennessee

Rita Keeling

662-686-5201

rkeeling@ars.usda.gov

Midwest Area

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Marie Bishop

309-681-6632

bishopm@mwa.ars.usda.gov

North Atlantic Area

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Winifred Owens

215-233-6625

winifred.owens@ars.usda.gov

Northern Plains Area

Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, Utah, Wyoming

Kathleen White

970-229-5503

kathleen.white@ars.usda.gov

Pacific West Area

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Charmaine Scardina

510-559-6076

cscardina@pw.ars.usda.gov

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Tony Edmund

706-446-3614

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tedmund@saa.ars.usda.gov

Southern Plains Area

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Debra Owens

979-260-9416

DOWENS@spa.ars.usda.gov

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Joyce Rice

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jrice@nal.usda.gov

Headquarters Contacts

Washington, D.C. and Maryland

Eastern Services Branch

Human Resources Division

Sybil Rodriguez

301-504-1370

For general information on student or summer employment, you can also contact:

Student Employment Program Coordinator

Human Resources Division

301-504-1434

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Student Educational Employment Program. This program provides Federal employment opportunities to students who are enrolled or accepted for enrollment as degree-seeking students taking at least a half-time academic, technical, or vocational course load in an accredited high school, technical, vocational, 2-, or 4-year college or university, graduate or professional school. Following is a brief description of the two components of this program:

Student Temporary Employment Program (STEP). Job opportunities under this component offer temporary employment ranging from summer jobs to positions that can last for as long as you're a student. These employment opportunities need not necessarily be related to your academic field of study. Appointments are made for 1 year, and employees are not entitled to benefits except for sick and annual leave.

Student Career Experience Program (SCEP). This program offers valuable work experience directly related to your academic field of study. It provides formal periods of work that enhances your academic studies. It requires a commitment by you, your school, and the employing Federal agency. You may be eligible for permanent employment under this component after successfully completing your education and meeting work requirements. Under this program, employees are eligible to enroll in health and life insurance, participate in the Federal Employees Retirement System and Thrift Savings Plan, and earn sick and annual leave.

Student Hiring. For information on student employment opportunities within the Agricultural Research Service, please contact the location where you would like to work. Information on our research locations can be found on the ARS web site at: <http://www.ars.usda.gov/research.html>

Eligibility Requirements. You are eligible under the Student Educational Employment Program if you are:

- Enrolled or accepted for enrollment as a degree-seeking student (diploma, certificate, etc.)
- At least the minimum age required by Federal, State, or local laws and standards governing the employment of minors
- Taking at least half-time academic or vocational and technical course load in an accredited high school, technical or vocational school, 2- or 4-year college or university, graduate or professional school
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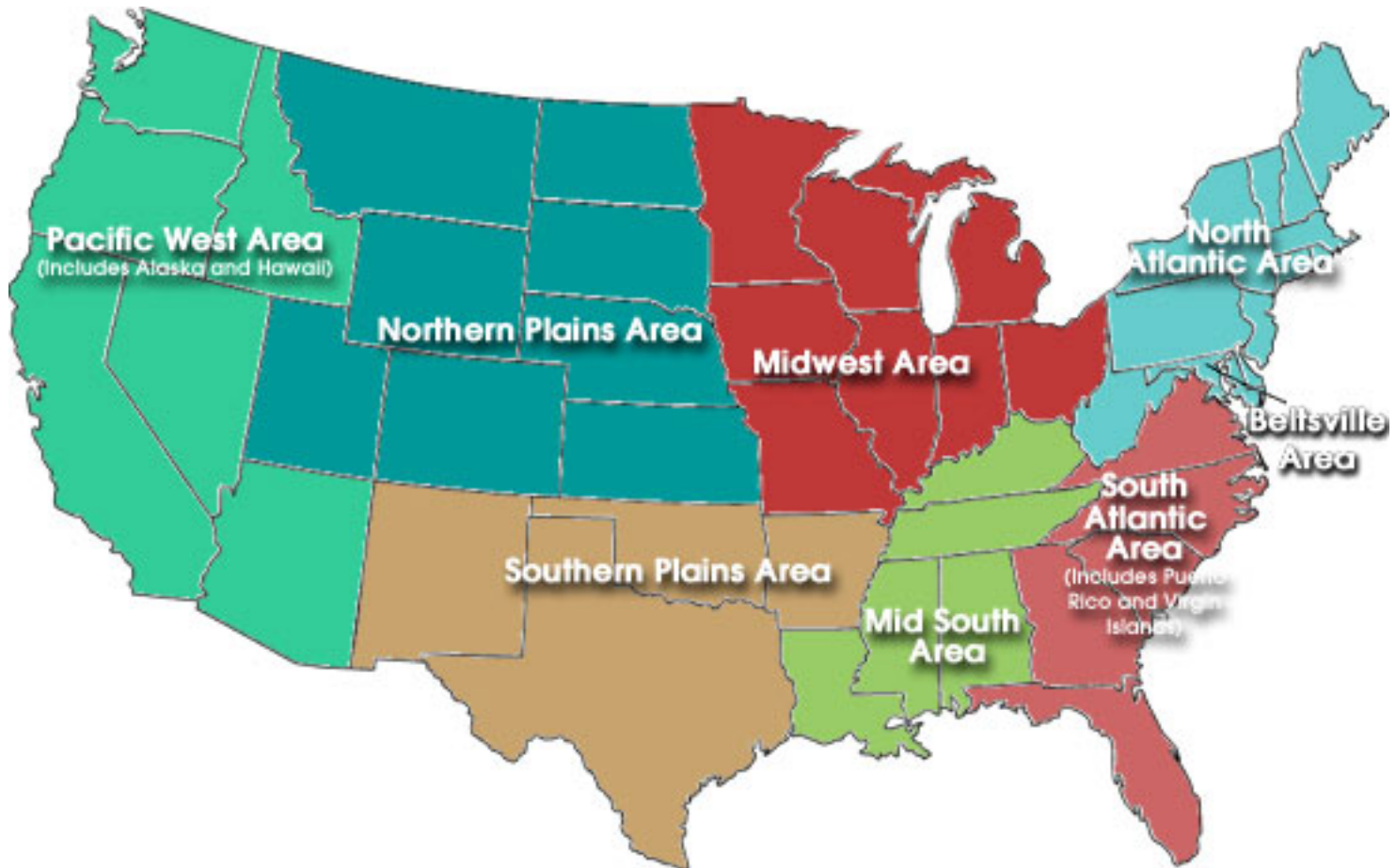
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Our job is finding solutions to agricultural problems that affect Americans every day, from field to table—

- Protecting crops and livestock from pests and disease,
- Improving the quality and safety of agricultural products,
- Determining the best nutrition for people from infancy to old age,
- Sustaining our soil and other natural resources,
- Ensuring profitability for farmers and processors,
- Keeping costs down for consumers, and
- Providing research support to other federal agencies.

Lasting solutions to these problems are unlikely to have a quick commercial payoff that might otherwise convince private industry to do the research. We work toward solutions by pursuing scientific discoveries. But our task is truly complete when we transfer discoveries to society as useful technology and knowledge.

Our scientists frequently collaborate with research partners from universities, companies, other organizations and other countries.

We take great care in designing and organizing our research effort, and we listen—and respond—to those with a stake in the outcome. (More in "[The Research Enterprise](#)")

We follow a strategic plan we develop to meet our stakeholders' needs and support USDA's mission. We check our progress in carrying out that plan, and we modify it as circumstances require. (More in "[Plans and Reports](#)").

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- 1,200 research projects within 22 National Programs
- 2,100 scientists
- 6,000 other employees
- 100 research locations including a few in other countries
- \$1 billion fiscal year 2003 budget

ARS is one of four agencies in USDA's [Research, Education and Economics](#) mission area. The others:

- [Cooperative State Research, Education and Extension Service](#)
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What Does the Agricultural Research Service Do for You?

Because of advances by our scientists and research partners:

- Some infant formulas now are closer to mother's natural milk. ([more](#))
- Many popular foods contain a fat replacer made from oats and barley. ([more](#))
- Tomorrow's sunscreens could be made from soybean oil. ([more](#))
- Campers and others have the best available mosquito protection. ([more](#))
- American farmers plant high-quality, disease- and pest-resistant kinds of wheat and many other crops. ([more](#))



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ARS Oil-Refining Technology Gives Baby Formula a BoostBy [Amy Spillman](#)

December 2, 2002

Omega-3 fatty acids such as DHA (docosahexaenoic acid) and ARA (arachidonic acid) are important nutrients that the body needs. Their consumption may help reduce the risk of coronary heart disease, and they are found in high concentrations in nerve cell membranes and the retina. They are also found in human breast milk.

Now, these nutrients are being added to some baby formulas sold in the United States, thanks in part to work done by Peter Wan, a chemical engineer at the [Agricultural Research Service's Southern Regional Research Center](#) in New Orleans.

The best-known source of omega-3 fatty acids is oil from coldwater fish, according to Wan. Unfortunately, fish oil is highly unsaturated and oxidizes quickly, meaning it goes bad very fast and smells fishy. Because it's such an unstable ingredient, it is not used in baby formulas produced for the U.S. market.

Fish oil is not the only source of omega-3 fatty acids, though. Several years ago, researchers at [Martek Biosciences Corporation](#) in Columbia, Md., identified algal and fungal species that are rich in DHA and ARA and found a way to harvest them in the lab. They contacted Wan when they began having problems refining the algal oil.

Wan is an expert in the technology used to separate and purify edible oils. At the time, he was working on ways to improve the quality of cottonseed oil, which is difficult to refine because it contains natural pigments and variable amounts of free fatty acids. The processing method he developed works well with dark-colored oils, and, through a confidential agreement, he was able to give advice to the Martek scientists, who were trying similar methods to refine their algal oil.

[Read more](#) about the benefits of omega-3 fatty acids and the part Wan played in bringing them to baby formula in the [December 2002 issue](#) of [Agricultural Research](#) magazine.

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July 13, 2004

Agricultural Research Service

scientists have identified several nutritional and physical activity factors that affect chronic health diseases among American Indians.

Jacqueline S. Gray, a postdoctorate researcher with the ARS Grand Forks Human Nutrition Research Center ([GFHNRC](#)) in Grand Forks, N.D., used a mobile nutrition research laboratory to access powwows and reservations to collect data. This month, she returns to the tribes to present research findings.

American Indian tribes, considered sovereign domestic nations, are among the most impoverished of minority groups in America.

They experience a disproportionately high incidence of diabetes, obesity and heart disease. Native Americans also have the highest per-capita suicide rate, nearly two-and-a-half times the national average and more than four times the national average among 15- to 24-year-olds.

The study was directed by psychologist James G. Penland and physiologist Henry C. Lukaski with the center's Mineral Nutrient Functions Research Unit.

More than 60 percent of the survey participants indicated they had a family member who had been diagnosed with diabetes. Food insecurity was a problem among 26 percent of those surveyed. That meant that during the

Read the [magazine story](#) to find out more.



Ellen Wilson (left), summer intern from the Three Affiliated Tribes, New Town, North Dakota, uses a wrist monitor to take the blood pressure of Donna Grandbois, Turtle Mountain Chippewa from Belcourt, North Dakota, outside the Mobile Nutrition Research Laboratory. [Click the image for more information about it.](#)

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previous 12 months, they had experienced various degrees of limited or uncertain access to nutritionally adequate and safe foods.

Depression-related symptoms were found to be associated with poorer health, less exercise, food insecurity, higher body mass index in females, carbohydrate intake in males and tobacco use. Depression scores were highest among those reporting lower income, more children, and food insecurity. But they were lowest among those reporting a stronger identity with their native culture.

The resulting study data will be used for designing and implementing effective interventions to improve health and quality of life among American Indians. Gray and Penland are providing a technical report to all participating tribal groups for their use when applying for grant programs.

[Read more](#) about this research in the July issue of *Agricultural Research* magazine.

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Scientists Mobilize To Conduct Nutrition Research Among American Indians

By Rosalie Marion Bliss

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member who had been diagnosed with diabetes. Food insecurity was a problem among 26 percent of those surveyed. That meant that during the previous 12 months, they had experienced various degrees of limited or uncertain access to nutritionally adequate and safe foods.

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Breaking Barriers to American Indian Nutrition Research



Ellen Wilson (left), summer intern from the Three Affiliated Tribes, New Town, North Dakota, uses a wrist monitor to take the blood pressure of Donna Grandbois, Turtle Mountain Chippewa from Belcourt, North Dakota, outside the Mobile Nutrition Research Laboratory. The researchers traveled over 7,000 miles to powwows and other social gatherings during the American Indian study to gather data on study participants.

(K11305-1)

Over the past 2 years, Jacqueline S. Gray, an [ARS](#) postdoctoral scientist, took a four-wheel-drive past scenic vistas, through undeveloped pastures, and across rugged terrain to attend powwows and health fairs on reservations and other American Indian communities. Alongside, during each trip, was a mobile nutrition research laboratory, developed by scientists at the Grand Forks Human Nutrition Research Center in Grand Forks, North Dakota, to bring nutrition research to underserved populations. Aided by summer interns and graduate students, Gray, of Choctaw and Cherokee descent, collected information about the diets, physical and mental health, physical activity, and access to healthy foods of hundreds of American Indians.

American Indians are among the most impoverished of minority groups in America. They experience a disproportionately high incidence of diabetes, obesity, and cardiovascular disease. Their rate of diabetes is about three times that of the U.S. population as a whole, approaching 40 to 50 percent in adults. And depression is thought to be pervasive within the more than 500 federally recognized tribes that make up the population. Native Americans have the highest per capita suicide rate-nearly 250 percent the national average, and nearly 430 percent the rate among 15- to 24-year-olds.



Richard Street (left), a champion grass dancer and member of the Mesquakie Tribe, talks with ARS postdoctoral fellow Jacqueline Gray about the American Indian health study after a dance event. Street participated in the study during the first summer.

(K11307-9)

The goal of the research project is to determine the role of nutrition and physical activity in the development and course of diabetes, heart disease, depression, and other health problems faced by these U.S. communities. The research study was led by psychologist James G. Penland and physiologist Henry C. Lukaski, with the Grand Forks center's Mineral Nutrient Functions Research Unit. The researchers anticipate that the resulting data will be useful in designing and implementing effective interventions to improve health and quality of life among American Indians.

To gain the access to reservations and powwows necessary to conduct the research, Gray met with four tribal councils, two tribal community college presidents, and the chair of the Trenton Indian Service Area.

"Because Indian tribes are considered to be sovereign domestic nations, professionals who want to collect data from them must first obtain permission," says Gray. "We had to present what we wanted to do and describe how the research would benefit the communities. We also had to discuss who would own the data."



Research psychologist James Penland (left) and Jacqueline Gray review data from the American Indian health study.

(K11300-1)

Several of the center's summer interns helped to facilitate and present the information to governing groups on the reservations.

"We had 458 participants whom we classified as Northern Plains Indians, or those coming from Minnesota, North and South Dakota, Montana, and Wyoming," says Gray.

Building Bridges

Most participants completed a questionnaire about their access to adequate food supplies. Their answers showed that 74 percent lived in households that were "food secure"—meaning they had access at all times to enough foods for an active, healthy life for all household members. Ten percent were food insecure, with moderate to severe hunger, and the

remaining 16 percent were food insecure, but without hunger.

"That meant that during the past 12 months, those 16 percent experienced limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire acceptable foods in socially acceptable ways," Penland says.

Depending on income and availability, many American Indians' diets are based on government-provided commodities—foods that are very different from traditional native fare. To learn more about the effects of these differences on such a diverse population, the researchers collected information from participants about the types of foods they'd eaten during the last month.

"Future research could reveal whether there is a difference in blood sugar control between those who consume a diet composed of traditional native foods and those who consume a diet of commodities foods," says Gray.

Measuring the extent of depression among the participants was also key. "We found that depression questionnaires originally developed for use with the general population could successfully be used with Northern Plains Indians," she says. Measures of depression were found to be strongly associated with measures of generalized distress.

The researchers also found that depression-related symptoms were associated with poorer health, less exercise, food insecurity, and tobacco use in both males and females, and with carbohydrate intake in males and higher body mass index in females. Overall, factors such as gender, socioeconomic status, and a strong cultural identity were found to significantly influence self-reported depression scores taken from the questionnaires. Depression scores were higher in those reporting lower income, more children, and food insecurity. Depression scores were lower in those reporting stronger identity with native culture and language.

Last, on many reservations, diabetes proved to be the major issue. More than 60 percent of participants indicated that a family member had been diagnosed with it. The researchers also found instances of chronic health problems—such as kidney and heart disease—that could be traced back to diabetes.

Results To Buoy Grants

When they received permission to do the study, the research group pledged to return to the reservations after the data had been analyzed. They promised to share and discuss the results with the tribes before they were published, so that the tribes could remain in control of, and engaged in, the process.

Tribal representatives hope the research data will provide a foundation for programs to identify, prevent, or treat health problems such as diabetes and obesity, as well as to fund health-education programs highlighting the link between nutrition and chronic diseases.

"Once the final analysis is done, we'll prepare a technical report for each tribal group. That data will then be available to them as a reference when applying for grants," says Penland.—By **Rosalie Marion Bliss**, Agricultural Research Service Information Staff.

This research is part of Human Nutrition, an ARS National Program (#107) described on the World Wide Web at www.nps.ars.usda.gov.

*To reach scientists mentioned in this article, contact **Rosalie Bliss**, USDA-ARS **Information Staff**, 5601 Sunnyside Ave., Beltsville, MD 20705-5129; phone (301) 504-4318, fax (301) 504-1641.*

"Breaking Barriers to American Indian Nutrition Research" was published in the **July 2004** issue of *Agricultural Research* magazine.

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Breaking Barriers to American Indian Nutrition Research



Ellen Wilson (left), summer intern from the Three Affiliated Tribes, New Town, North Dakota, uses a wrist monitor to take the blood pressure of Donna Grandbois, Turtle Mountain Chippewa from Belcourt, North Dakota, outside the Mobile Nutrition Research Laboratory. The researchers traveled over 7,000 miles to powwows and other social gatherings during the American Indian study to gather data on study participants.

(K11305-1)

Over the past 2 years, Jacqueline S. Gray, an [ARS](#) postdoctoral scientist, took a four-wheel-drive past scenic vistas, through undeveloped pastures, and across rugged terrain to attend powwows and health fairs on reservations and other American Indian communities. Alongside, during each trip, was a mobile nutrition research laboratory, developed by scientists at the Grand Forks Human Nutrition Research Center in Grand Forks, North Dakota, to bring nutrition research to underserved populations. Aided by summer interns and graduate students, Gray, of Choctaw and Cherokee descent, collected information about the diets, physical and mental health, physical activity, and access to healthy foods of hundreds of American Indians.

American Indians are among the most impoverished of minority groups in America. They experience a disproportionately high incidence of diabetes, obesity, and cardiovascular disease. Their rate of diabetes is about three times that of the U.S. population as a whole, approaching 40 to 50 percent in adults. And depression is thought to be pervasive within the more than 500 federally recognized tribes that make up the population. Native Americans have the highest per

capita suicide rate-nearly 250 percent the national average, and nearly 430 percent the rate among 15- to 24-year-olds.



Richard Street (left), a champion grass dancer and member of the Mesquakie Tribe, talks with ARS postdoctoral fellow Jacqueline Gray about the American Indian health study after a dance event. Street participated in the study during the first summer.

(K11307-9)

The goal of the research project is to determine the role of nutrition and physical activity in the development and course of diabetes, heart disease, depression, and other health problems faced by these U.S. communities. The research study was led by psychologist James G. Penland and physiologist Henry C. Lukaski, with the Grand Forks center's Mineral Nutrient Functions Research Unit. The researchers anticipate that the resulting data will be useful in designing and implementing effective interventions to improve health and quality of life among American Indians.

To gain the access to reservations and powwows necessary to conduct the research, Gray met with four tribal councils, two tribal community college presidents, and the chair of the Trenton Indian Service Area.

"Because Indian tribes are considered to be sovereign domestic nations, professionals who want to collect data from them must first obtain permission," says Gray. "We had to present what we wanted to do and describe how the research would benefit the communities. We also had to discuss who would own the data."



Research psychologist James Penland (left) and Jacqueline Gray review data from the American Indian health study.

(K11300-1)

Several of the center's summer interns helped to facilitate and present the information to governing groups on the reservations.

"We had 458 participants whom we classified as Northern Plains Indians, or those coming from Minnesota, North and South Dakota, Montana, and Wyoming," says Gray.

Building Bridges

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
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Evaluation of New Canal Point Sugarcane Clones 1997-98 Harvest Season

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